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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/457,724	12/10/1999	JOE CARLIN	ARGO.0001	7995
38327	7590	05/04/2004	EXAMINER	
REED SMITH LLP 3110 FAIRVIEW PARK DRIVE, SUITE 1400 FALLS CHURCH, VA 22042			CORRIELUS, JEAN B	
			ART UNIT	PAPER NUMBER
			2631	6
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/457,724

Applicant(s)

CARLIN ET AL.

Examiner

Jean B Corrielus

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/15/00&6/20/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 and 52-105 is/are pending in the application.
- 4a) Of the above claim(s) 105 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-48, 62-67, 75, 85-90, 98, 99, 102 and 104 is/are allowed.
- 6) ☒ Claim(s) 1-5, 8, 9, 49, 50, 55, 56, 58-61, 68-74, 76-84, 91-97, 100, 101 and 103 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 10, 52-54 and 57 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Examiner's comment

1. This office action is to replace the communication filed on 3/20/03 so as to address added claims 62-105.

Allowable Subject Matter

2. The indicated allowability of claims 4 and 49 is withdrawn in view of the newly discovered reference(s) to Agee US Patent No. 61,28,276 and Otto US Patent No. 6,600,774.

Rejections based on the newly cited reference(s) follow.

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 8, 9, and 81 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 8, recites "a bandwidth at **least 30% lower** than a bandwidth of said at least one signal. However, the specification, as filed, does not provide support for such limitations as claim. Claims 9 and 81 are likewise rejected because of their dependency to a rejected claim.

5. Page 21, line 20, “figure 2b” is mistyped as “figure2b”.

Claim Objections

6. Claims 22, 70, 74 and 78 are objected to because of the following informalities:
Claim 21, line 2, “magnitude” needs to be deleted so as to be consistent with antecedent in claim 17. The same comment applies to claim 22, line 2. Claim 70, line 12, recites “selecting said hyperchannelized complex spectral component streams” such a claim language suggests that the plurality of hyperchannelized complex spectral component streams are selected while, according to the specification only one of such signal is selected as the signal of interest. The claim should be amended to reflect teaching of the original disclosure. In addition, shouldn’t “direction of arrival activity analysis” recited in claim 70, last line, should be replaced by “determined angle of arrival” recited in line 10. Claim 74, what does it means by “**said step of converting** the plurality of said signals ... **is phase coherent**”? Claim 78 “angle-or” should be “angle-of”
Appropriate correction is required.

7. Claim 105 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim can’t depend on a multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim 105 has not been further treated on the merits.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 84 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 84, line 3, the limitation "said weights" lacks of proper antecedent basis.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claim 82-84 are rejected under 35 U.S.C. 102(b) as being anticipated by Agee US patent No. 6,128,276.

Agee discloses a method and apparatus comprising providing a plurality of sources or antennas 326; receiving inherently via said sources or antennas a plurality of signals containing inherently the same frequency ranges; converting the plurality of said

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signals into a plurality of sub-band signals at the output of element 320; fast Fourier transform channelizing said plurality of sub-band signal using element 328 into a respective plurality of hyperchannelized complex spectral components combining in combiner 332 to form one directional beam and performing using element 336 signal detection on said beamformed hyperchannelized complex spectral components.

As per claim 83, Agee teaches a circuit "CG-SCORE" circuit used to apply a weight for signal enhancement.

As per claims 84, said weight is determined by "CG-SCORE" circuit.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamdy et al US Patent No. 6,229,998.

Hamdy et al discloses a system (figs. 15&16) comprising a receiver 1502 for receiving a wideband signal; element 1504 functionally equivalent to the claimed sub-band conversion module for converting the wideband signal into a plurality of sub-band signals; a channeling module 1606 for Fast Fourier Transform channeling said plurality of subband signals into a respective plurality of complex spectral components and

processing module (1608, 1610 and 1612) for processing said plurality of complex spectral components, including means (1610 and 1612) for determining the presence of at least a signal of interest based on the multiple time averaging analysis (using element 1610) of said plurality of complex spectral components. However, Hamdy et al does not explicitly teach the use of high speed data router as a means for digitally routing respective plurality of module data between the modules. However, the use of high speed data router is old and well known in the art. Given that, it would have been obvious to one skill in the art at the time of the invention to interconnect each module using such a device in order to achieve efficient utilization of system resources.

14. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamdy et al US Patent No. 6,229,998 in view of Gardner et al US patent No. 5,260,968.

As applied to claims 1 and 5 above, Hamdy et al discloses every feature of the claimed invention but does not explicitly teach the use of a plurality of FFT channelizers operatively connected to receive corresponding ones of said subband signal and thereby generate a corresponding plurality of complex spectral components, and a data router port for routing said plurality of complex spectral components to said processing module.

In the same field of endeavor, Gardner et al discloses a plurality of FFT channelizers 38 operatively connected to receive corresponding ones of said subband signal and thereby generate a corresponding plurality of complex spectral components and a data router port 40 for routing said plurality of complex spectral components to

said processing module 42. It would have been obvious to one skill in the art at the time of the invention to incorporate such a teaching in Hamdy et al in order to enhance system processing speed.

15. Claims 3, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamdy et al US Patent No. 6,229,998 in view of Agee US patent No. 6,128,276.

As applied to claim 5 above, Hamdy et al discloses every feature of the claimed invention but does not explicitly teach the use of a plurality of channel processors operatively connected to said data router so as to receive corresponding one of sad plurality of complex spectra components, each of said channel processors being formed so as to determine the presence of signal activity and perform demodulation of a signal of interest. Agee teaches channel processors 330 operatively connected to said data router so as to receive corresponding one of sad plurality of complex spectra components, each of said channel processors being formed so as to determine the presence of signal activity and perform demodulation of a signal of interest. See col. 14, lines 58-col. 15, line 5. It would have been obvious to one skill in the art to incorporate such a teaching in Hamdy so as to enhance signal detection.

16. Claims 1-5, 8, 9, 49-50, 55-56, 58-61, 68-74, 76-81, 91-97, 100, 101 and 103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otto US Patent No. 6,600,774 in view of Hamdy et al US Patent No. 6,229,998.

As per claims 1 and 5, Otto discloses a system (figs. 5&7) comprising a receiver see fig. 7 for receiving a wideband signal; a sub-band conversion module (formed by

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78, 80, and 82 in each processor 74) for converting the wideband signal into a plurality of sub-band signals; a channeling module (84 in each processor) for Fast Fourier Transform channeling said plurality of subband signals into a respective plurality of complex spectral components and processing module (86 and 56) for processing said plurality of complex spectral components, including means (86) for determining the presence of at least a signal of interest. However, Otto does not explicitly teach the use of high speed data router as a means for digitally routing respective plurality of module data between the modules. It further fails to teach that the means (86) for determining the presence of at least a signal of interest. Is based on the multiple time averaging analysis of said plurality of complex spectral components. In the same field of endeavor, Hamdy et al teaches that the means (1612) for determining the presence of at least a signal of interest is based on the multiple time averaging analysis of said plurality of complex spectral components using element 1610). However, the use of high speed data router is old and well known in the art. Given that, it would have been obvious to one skill in the art at the time of the invention to interconnect each module using such a device in order to achieve efficient utilization of system resources. Furthermore, it would have been obvious to one skill in the art to incorporate Hamdy et al in Otto in order to improve data detection.

As per claims 2 and 50, Otto discloses a plurality of ADC 80 for converting the wideband signal from the receiver, a plurality of downconverters 82 operatively connected to said ADC so as to each generates a subband of the digitally converted signals to said channeling module.

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As per claim 3, the channelizing module includes a plurality of FFT processors 84 operatively connected to receive corresponding ones of said subband signals and providing the output of the FFT to the processing module (86 and 56)

As per claim 4, the processors includes a plurality of channel processors (86 and 56) operatively connected to said router, configured to determine the presence of signal activity and perform demodulation of at least one signal of interest within the corresponding complex spectral component see col. 6, line 65-col.7, line 9.

As per claims 8, 9, 55, 56, the FFT channelizer includes means 86 for hyperchannelizing the corresponding one of said plurality of subband signals.

As per claim 49, Otto further teaches the further step of determining an angle of arrival based on the spectral analysis see col. 6, line 65-col.7, line 9.

As per claims 58 and 78, Otto includes inherently an interferometric algorithm in order to determine the angle of arrival.

As per claims 59, 60, 79 and 80, it would have been obvious to one skill in the art to include a 2/3 channel comparative algorithm to determine the angle of arrival for better accuracy.

As per claim 61, the presence of at least one signal of interest is determined based on direction of arrival see col. 11, lines 50-61.

As per claims 70 and 77, signal of interest (hyperchannelized complex spectral) is determined based on direction arrival analysis.

As per claims 71 and 72, it would have been obvious to one skill in the art to spatially separate/ phase orthogonalized the antennas for better performance.

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As per claim 73, it would have been obvious to one skill in the art to calibrate said plurality of complex spectral so as avoid false signal detection.

As per claims 74 and 76, it would have been obvious to one skill in the art to phase coherent converting said subband signals in order to minimize phase error.

As per claims 91 and 81, it would have been obvious to one sill in the art to enhance signal quality of a range of the channelized complex spectral component streams by a priori so as to minimize signal errors.

As per claims 92 and 93, it would have been obvious to one skill in the art to incorporate a reference time frame source in Otto so as to monitor signal/system performance.

As per claims 94 and 95, it would have been obvious that the reference time would have been GPS clock and the reason to combine would have been the same as claim 92.

As per claims 96 and 97, it would have been obvious to one skill in the art to distribute one pulse per second time tick to each module so as to satisfy system processing requirement.

As per claims 100 and 101, Otto includes a time of arrival measuring module see col. 7, line 1.

As per claim 103, at col. 11, lines 53-55, Otto determine TDOA by comparing one or more pair of said times of arrival.

Allowable Subject Matter

17. Claims 11-48, 62-67, 75, 85-90, 98, 99, 102 and 104 are allowed. However, the claims must be amended, if necessary to overcome any objection and/or rejection set forth above.

18. Claims 6, 7, 10, 52-54 and 57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In addition, the claim(s) needs to be amended if necessary to overcome any objection sets forth above.

Response to Arguments

19. Applicant's arguments filed 6/20/03 have been fully considered but they are not persuasive. It is alleged that Hamdy does not teach a subband conversion module, however, it is noted that Hamdy teaches a module 1504 configured to receive one input signal and generating at least two streams of output signal. Such streams of output signal are considered as the claimed "plurality of subbands". It is further alleged that Hamdy does not teach a plurality of DDC's configured to receive a plurality of streams of digital samples. However, such limitations are not recited in the claims. Note that the output of the FFT corresponds to the claimed hyperchannelized complex spectral component streams.

20. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks
Washington, D.C. 20231

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or faxed to:

(703) 872-9314

(for informal or draft communications, please label "PROPOSED"
or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA., Sixth Floor (Receptionist).

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is (703) 305-4023. The examiner can normally be reached on Monday-Thursday from 7:00 A.M. to 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour, can be reached on (703) 306-3034.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.


Jean B. Corrielus

Primary Examiner

TC-2600 4/29/04